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RISK COMMUNICATION. RISK PERCEPTION

Abstract: Risk communication and risk perception are two areas within integrated risk management system. Risk communication can be defined as a two-way flow of information and risk assessment between experts, stakeholders, government authorities and public. Effective communication between stakeholders is of vital importance when making decisions on risk management. Perception implies a specific individual or group experience and attitude towards dangerous states and unwanted events. Risk perception can be related to risk identification and "risk appetite", that is way of dealing with risk situations and acceptability of the residual risk level. It is important to keep in mind that it is not possible to define a risk without established criteria, and that the criteria are a direct consequence of risk perception and risk management policies.

Key words: risk communication, risk perception, risk management, unwanted event

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1. RISK COMMUNICATION

Communication in risk management

During crisis people suffer significantly due to incorrect information or bad risk perception. Within the communication, as an integral risk management factor, stakeholders and exposed groups should be adequately informed with developed objective risk perception and possibility of reducing risk probability consequences. For effective communication, it is essential that potential recipients be aware of main psychological and social mechanisms of perception as means for avoiding mistakes.

The phrase „risk communication“ first appeared in 1984 and arose during the research of risk perception problems [7]. Risk communication takes place in different situations and circumstances, and particular challenge is communication during the high impact risk occurrence. Crisis management implies the need for a rapid response to very complex challenges, informing and dissemination of information, informing the public, but also protection against consequences of panic or other forms of behavior that can lead to „secondary hazards“, or risk consequences escalation due to inadequate communication.

Efficient communication in extremely stressful situations and conditions of great concerns is exposed to a series of controversies. During hazard identification and preliminary risk assessment, it is necessary to balance between the rights and the needs of the vulnerable groups to have informations of dangers that threaten and possible additional consequences if vulnerable groups behavior is inadequate. The key determinant of safe treatment is that the exposed groups are not reacting excessively or panically, but also that information concealment or inadequate qualification of the endangered group does not inhibit participants in carrying out risk reduction measures or consequences.

Communication requirements change dramatically in high stress conditions and in emotionally „charged“ situations. In addition, risk communication can be seen in a wider context in terms of exchanging information, knowledge and experiences that can improve risk management. As a form of communication, the dissemination of safety information between the parties concerned or in public can be considered. Organizations in field of protection and rescue are more often publicly disseminate experiences and knowledge to prevent unacceptable „repetition of same or similar unwanted events“.

As a result of decades of experience in risk management, in recent practice, there is substitution of conventional „normative“ approach in safety strategies to „active approach“. The key difference is that a normative approach to risk management is governed by standardizing a wide range of procedures and protective techniques, while in an active approach the principle is that an unwanted event can not occur if it can be predicted.

If unwanted events prevention is identified as the primary risk management function, unwanted events from the aspect of prevention can be divided into:

- Unwanted events with pronounced anthropogenic influences, i.e. those that could be foreseen and prevented by risk management measures.
- Unwanted events that do not have a decisive anthropogenic impact, i.e. those whose probability of occurrence is not under decisive anthropogenic influence.

The boundaries between these two categories are shifted on a daily basis through the science and technology development, and by the process of hazard identification and risk management improvements.

Predictability limits are moving and unwanted events that take place for the first time in a particular way may be repeated in the same or similar event scenario. The most important safety practices and regulations were created after major tragedies, ie key risk management experience is product of experiences that we are trying to avoid.

In order to implement experience from unwanted events, it is necessary to „communicate" about learned lessons and to implement new practices in similar situations, regardless of whether repeated situation take place after a certain time or at the other end of the world.

Lessons learned can be implemented only if experiences are collected, written and made publicly available, ie if continuous and efficient communication between entities participating in risk management process takes place.

Repeated unwanted events due to missed opportunities to learn about a previous experience and prevent a similar scenario are unacceptable in risk management. It is therefore extremely important to carry out safety information dissemination, experiences and knowledge at all stages and on a broad basis.

Communication as an „information exchange" in risk management field can be observed in different contexts::

- Theoretical context in field of knowledge applied in risk management theory and practice, norming and standardization, establishing good risk management practice, etc.
- Educational context in field of knowledge and experience dissemination, education, training, knowledge testing, skills and performance evaluation.
- Practical context in management models design, adaptation and safety techniques modernization and improvements in risk management.
- Managerial context within the management structures communication, management and other forms of decision-making.
- Administrative context within the framework of experience and practice exchange in process of laws and standards implementation within the competence of state bodies or international bodies in accordance with provisions of international law.
- Investigative and forensic context in identifying causes of unwanted events, identifying mechanisms of occurrence, failures that led to unwanted events, and establishing link between legal norms and scientific disciplines within which some unwanted events are being investigated.

From the risk management perspective, the purpose of risk communication is to help vulnerable population to understand risk assessment and risk management process in order to form a clear judgement for possible risks and take part in decision making [12]. Ideally, risk communication is a two-way conversation in which an agency / organization informs and is informed by members of affected community.

Risk communication is also defined as two-way communication between participants on the existence, nature, form, size, or risk acceptability. It is vitally important to understand that communication among participants is an integral part of the risk management process.

Standard ISO 31000 is not even defining risk communication separately, but as part of the consultation process:

„..Continual and iterative processes that an organization conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of risk“. This definition, however, at least indicates the need for communication with stakeholders and that this process is iterative, but it does not provide instructions on how to do it and does not indicate what makes risk communication effective.

The focus of risk communication has evolved since the 80s of the past century, from the effort to inform public about technical aspects of risk assessment to the development of a process of early and lasting dialogue among the participants. Although various agencies have prepared guidelines for risk communication, introducing principles into practice is a long-term process that requires considerable resources, time and efforts. Permanent information and ideas exchange between risk managers and affected public is fundamentally important for risk management process. Practice has confirmed that decisions made with the participation of stakeholders and affected parties are the most effective.

Definitions and risk communication theory

Adequate translation of English term „risk communication“ in sence of communication that gives a better insight into a particular type of risk can hardly be found in most languages.

Risk communication has previously referred to informing persons exposed to a risk with a purpose to point them at risk in order to properly act and prevent unwanted events. Recently, it was realized this is not a one-way process of sending information, but two-way communication - information exchange, an interactive process involving a large number of participants.

Today's society provides a plenty of informations, far more than any individual can „digest“ [17]. Because of the limited amount of information a person can handle at a certain time, most of the information that average person is exposed to will be neglected. Upon receiving the information, the mechanisms of „common sense“ handle the information and direct conclusions. An example of an intuitive risk assessment strategy is use of „mini-max“ rule when making decisions, ie choosing an option that minimizes the

worst possible outcome. The use of this rule is not irrational, it has evolved with the development of human behavior as a fairly successful strategy of dealing with uncertainties [17].

Risks associated with inefficient risk communication cause unacceptable loss of management credibility, unnecessary and costly conflict with stakeholders, shifting focus from important issues to less important, loss of support and criticism, unnecessary human suffering due to pronounced anxiety and fear.

Covello recommends four risk communication theories [3]:

- **"Menthal Noise Theory"**: when people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often have difficulty processing information.
- **"Trust Determination Theory"**: when people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often become distrustful.
- **"Negative Dominance Theory"**: when people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often give greater weight to negative information than to positive information.
- **"Risk Perception Theory"**: Perception equals reality. What matters the most in determining risk perceptions and public outrage are factors such as trust, benefits, familiarity, voluntariness, control, dread, uncertainty, memorability, fairness, and accountability.

Communication lifecycle

The „communication lifecycle" principle implies that communication related to a particular risk includes a total communication domain that may be of importance for risk management at any stage, especially in cases of risk with major magnitude or disasters with catastrophic consequences.

The communication domain of risk management can be observed in several dimensions:

- **Time dimension** of the communication domain implies prior analysis of experience and knowledge, learning about the lessons learned.
- **Space dimension** of the communication domain refers to the area where the messages are being exchanged.
- **Organizational dimension** of the communication domain defines risk communication as an integral part of regular and extraordinary jobs and procedures.
- **Sectoral dimension** of the communication domain implies inclusion of relevant bodies or individuals for particular profession or science fields, and adequate coordination between different professions and fields.
- **Social dimension** of the communication domain implies involvement of exposed or interested social groups in communication.

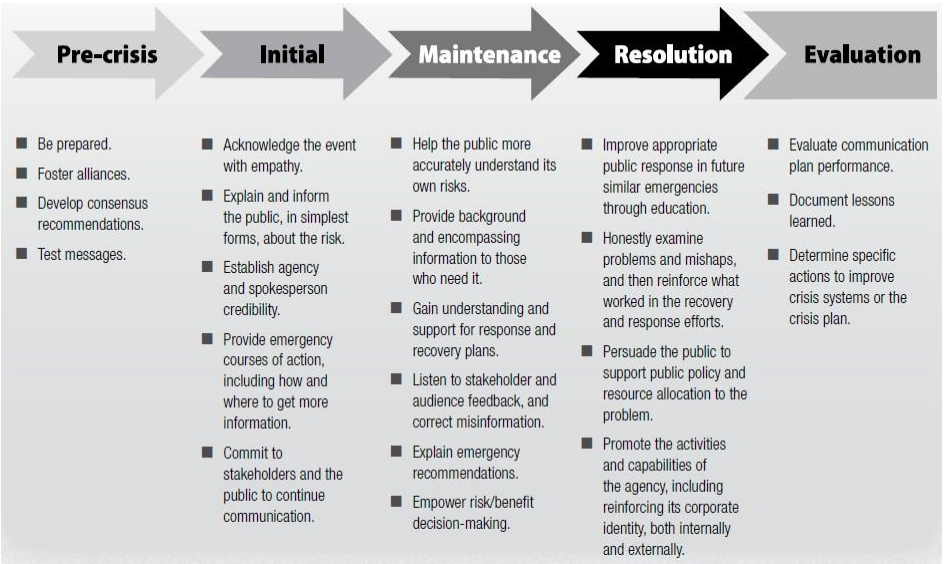

Figure 1 – Crisis and Emergency Risk Communication, source: [18]

In the *initial* or „pre-crisis“ phase, as the first step in communication, the communication domain is all available knowledge that can affect risk management effectiveness. Of particular importance is the study of similar risks in other equivalent systems, observation of knowledge dissipated by various safety organizations, expert and scientific gatherings or literature. At this stage, planning and preparation is carried out. Communication goals during pre-crisis phase are focused on communication and education campaigns. These campaigns inform public and community. At this stage it is especially necessary to [18]:

- Monitor and recognize emerging risks.
- Educate general public about risks.
- Prepare the public for possibility of an adverse event.
- Increase self-efficacy by suggesting actions that reduce likelihood of harm.
- Provide warning messages regarding an imminent threat.
- Collaborate and cooperate by developing alliances with agencies, organizations, and groups.
- Develop consensus recommendations by experts and first responders.
- Create messages and test them for use in later stages.
- Build and test communication systems

At this stage, significant information and assumptions were determined even before the a crisis event occurrence, plans were developed and open communication was established.

Table 1 – Risk communication in the risk management process, source: [18]

RISK MANAGEMENT STEP	RISK COMMUNICATION TASK
Initiation	• Identify stakeholders • Consult with stakeholders in defining scope of issue
Preliminary Analysis	• Develop stakeholder analysis for ongoing verification and refinement
Risk Estimation	• Discussion of source, exposure issues • Communication of results with stakeholders • Assess changes in knowledge/perception in light of new information
Risk Evaluation	• Elicit stakeholder perceptions of the risks and benefits, and the reasons for these, if possible • Assess stakeholder acceptability of the risk
Risk Control	• Consult with stakeholders to gain input into identifying and evaluating control options • Inform stakeholders of chosen risk control and financing strategies; • Inform stakeholders of benefits, costs, and any new risks associated with proposed control options; • Evaluate acceptance of control options and residual risks; • Determine if risk trade-offs might be possible
Implementation (Action)	• Communication of risk control decision and implementation
Monitoring	• Ensure implementation of communication strategies • Monitor changes in needs, issues, concerns of existing or new stakeholders

In the initial phase, risk communication tasks involve identifying stakeholders and assessing their risk vision for the purpose of defining range of problems to be solved. Stakeholders are groups that may be (or are) affected by risk, risk managers, and groups that will be influenced by all efforts to manage the source of risk. Stakeholders can also be decision-makers, social groups, local authorities, public health institutions, companies, trade unions, media, individuals and groups, environmental organizations, government agencies. Participants' involvement level depends on specificity of the situation.

Communication goals during the initial phase include quick public communication and quick communication with affected groups. When communicating in the initial phases of an emergency, it is important to present information that is simple, credible, accurate, consistent and delivered on time.

Crisis initial phase is characterized by confusion and intense media interest. Informations are usually incomplete and the facts are limited. It is important to recognize that information from media, other organizations, and even within the organizations that provide response does not have to be accurate or sufficiently defining the problem. It is essential to foresee urgent treatment measures, authority and responsibility for certain issues, deadlines and ways of carrying out first response, responsibility for unwanted event identification and qualification, and confirming the magnitude of the event in shortest time possible.

One of the best ways to limit public anxiety in crisis is to provide useful information about the event and tell people what they can do. During the initial phase of the event, response organizations and spokespersons should take steps to establish their credibility. Even when a few information is available, it is possible to say how the organization is carrying with situation and when more information will be available. The public will question the immediate threats, lasting threat and require problem solutions. Responsible authorities for public communications should be ready to respond to these questions as quickly as possible, accurately and completely, and to inform them of the uncertainty of the situation. At same time, they will have to direct people to places where more information is available. Communication during crisis, as an integral part of crisis management, involves sharing information with vulnerable groups, the public and other partners, taking into account following principles [18]:

- Ensure that the public is updated, understands ongoing risks, and knows how to mitigate these risks.
- Provide background and supportive information to those who need it.
- Encourage broad-based support and cooperation with response and recovery efforts.
- Gather feedback from the affected public—listen, learn, and assess.
- Correct misunderstandings, rumors, or unclear facts.
- Continue to help people believe they can take steps to protect themselves, their families, and their community. Continue to explain those steps.
- Support informed decision-making by the public based on their understanding of risks and benefits.

As the crisis evolves, anticipate sustained media interest and scrutiny. Unexpected developments, rumors, or misinformation may place further media demands on organization communicators. Other experts, professionals, and those not associated with the response will comment publicly on the issues. Sometimes they will contradict or misinterpret messages. Criticism about the response is inevitable and to be expected. Staying on top of the information flow and maintaining close coordination with others is essential. Processes for tracking communication activities and audiences become increasingly important as the workload increases.

After the first assessment and qualification of the unwanted event, implemented measures of urgent action to prevent repetition of accident or secondary accidents as a result of the primary event, begins the phase of solving or eliminating consequences, conducting investigative actions, forensic analysis of the qualification of failure or eventual liability [18]:

- Explain ongoing cleanup, remediation, recovery, and rebuilding efforts to your audience.
- Motivate them to take action if needed.
- Facilitate broad-based, honest, and open discussion about causes, blame, responsibility, resolutions, and adequacy of the response.

- Improve individual understanding of new risks.
- Promote behaviors that avoid risks.
- Promote personal preparedness.
- Promote the activities and capabilities of agencies and organizations by reinforcing positive identities and images.
- Persuade the public to support public policy and resource allocation to the problem.

During the recovery and reconstruction, there is much less public and media interest. Post-crisis communication management is largely concerned with providing answers to how and why there was a crisis, what was wrong, and what was being done to prevent similar events from preventing or reducing their consequences.

Within the post-crisis communication it particulary important to:

- Discuss, document, and share lessons learned.
- Determine specific actions to improve crisis communication and crisis response capability.
- Evaluate the performance of the communication plan.
- Implement links to pre-crisis activities.

Elements of successful communication and risk communication models

Public awareness campaigns advocate risk communication messages to encourage a group of people to perform certain risk reduction measures by way of giving them information and promoting why these measures are the best means of reducing their specific risks (Aspinwall). Risk communication is part of the mitigating risk reduction function, which aims to manage key processes in high risk conditions or catastrophic events. The basic principles of effective risk communication can be summed up through risk communication stages as shown in Table 2.

Table 2 – Effective Communication Recommendations, source: [18]

Phase	Basic principles
Pre-crisis	- Provide an open and honest flow of information to the public. - Emphasize that there is a process in place.
Initial	- Don't over-reassure. - Acknowledge uncertainty. - Emphasize that a process is in place to learn more. - Be consistent in providing messages.
Maintenance	- Acknowledge fears. - Express wishes. - Give people things to do. - Acknowledge shared misery. - Give anticipatory guidance (foreshadow). - Address the "what if" questions, when appropriate. - Be a role model and ask more of people.
Resolution	- Acknowledge failures.

Accurate information combined with quick release of that informations establishes credibility. Empathy combined with openness establishes trust. Credibility combined with trust leads to successful communication (Figure 2).

Feedback is a critical part of the communication process. It enables sender to understand how the message is received and interpreted. The sender then has the ability to customize the message and improve its efficiency.

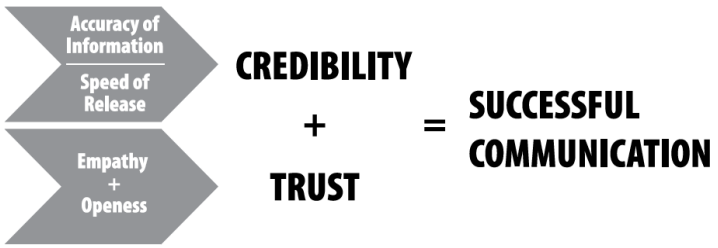

Figure 2 – Successful Communcation elements, source: [18]

The purpose of risk communication and the development of public awareness of the need for this type of communication is multiple:

- *Normative* or legislative, ie management bodies consistently apply regulations as well as other rules or vulnerable groups comply with legal norms, bylaws, standards, directives.
- *Informative* in terms of disseminating information on hazards and maintaining readiness for crisis response.
- *Advocacy* in terms of impact on process participants, especially in the decision-making system, on forming a public risk standpoint, risk assessment and criteria, risk indicators, and authorities and responsibilities in conducting risk management measures.
- *Educational* in a of continuous education of vulnerable groups and participants in the risk management or crisis management system.
- *Propaganda* in a sense of affirmative influence on individual opinions and attitudes, awareness of the risks existence, the appropriateness of fighting on their reduction and active participation in reducing likelihood or consequences of unwanted events.
- *Behavioral* in a sense of changing forms of risk behavior - avoiding dangerous actions, risk mitigation, etc., combining different concepts of social sciences theories.
- *Innovative* in terms of developing scientific and research interest in studying and improving crisis management and crisis management systems.

A group of authors (Bird, Gisladottir and Dominey-Howes) point out five factors that influence the ability to respond to a hazard situation: knowledge of hazards, risk perception, implementation of preparedness measures, disaster response and hazard and risk education.

Listed factors are related and depend on the social, political and economic context of community under risk and must be accessed holistically during the planning of each awareness raising campaign.

Blanchard-Boehm [2] proposes the General Model of Hazards Risk Communication (GMHRC) as a combination model of historical research on risk communication as explained in Figure 3:

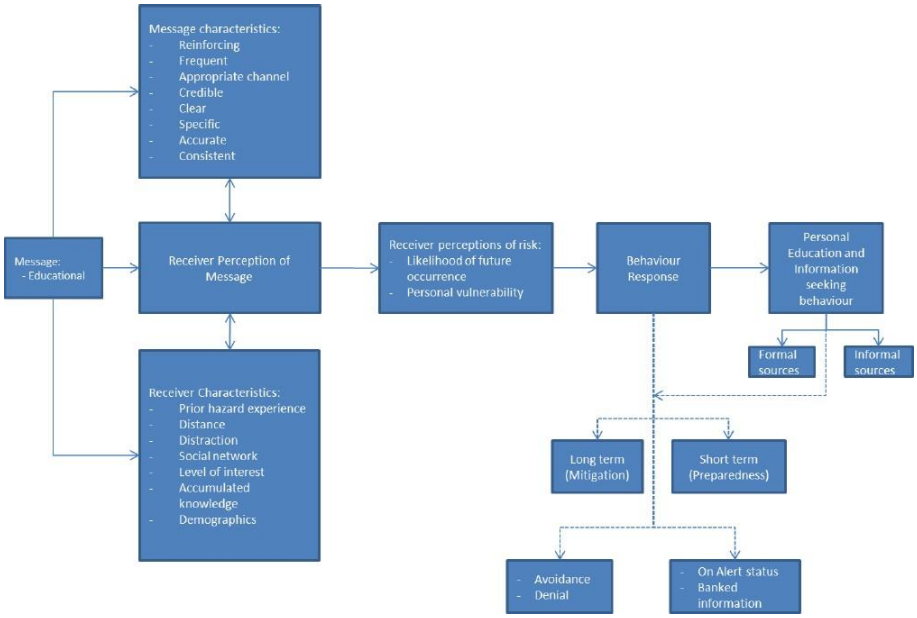

Figure 3 – General Model of Hazards Risk Communication, source: [2]

This model explains the various elements of risk communication and proposes that the process narrates as follows: a public awareness message is communicated via a specifically selected media conduit; the message's characteristics should be guided by the audience's characteristics, and should be frequent, credible, and accurate in nature and aiming to positively influence the receiver's perception of the message. The receiver has certain characteristics which are predisposed by his or her previous experiences of the said hazard, their social context and previous knowledge. The receiver then compares the message to his/her perception of risk and a behaviour response is triggered which either leads to personal education and information seeking activities and/or long- or short-terms risk reduction activities. The opposite effect that a risk communication message could have is that it leads to apathy or denial of the risk, creating more vulnerability and could lead to higher levels of risk.

The model presented in Figure 4 outlines the components of risk communication pursuits and the related socio-psychological processes.

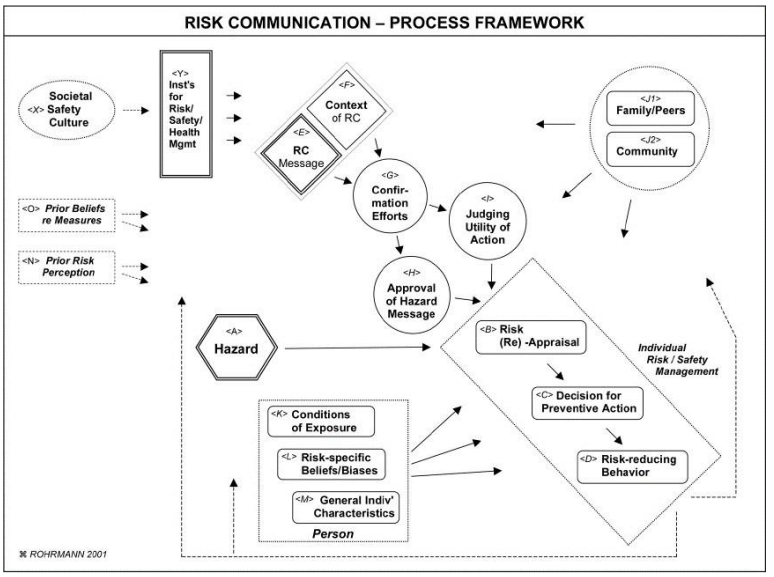

Figure 4 – Components of risk communication and related socio-psychological processes, source: [16]

The focus is on an individual rather than collective (community) level of activities. The core endeavour is to modify risk perceptions and risk attitudes towards protective risk behavior. The outlined framework has been utilized in several studies on risk communication about both technological hazards and natural disasters (Rohrmann).

In short, the model expresses that the final outcome variable, risk-reducing behavior <D> regarding a hazard <A>, is determined not just by the communicated messages of the information/education program <E> but the result of a complex evaluation process <B-C and G-H-I>, including prior attitudes <N, O>, and influenced by personal characteristics <K, L, M> and manifold context factors, e.g., attributes of the information source and channel features <F> utilized by the respective authority/agency <Y>, as well as family/peers/friends and the community one belongs to <J>. The whole process is embedded into a culture's health and safety orientation <X>. As the feedback-loops in the figure indicate, risk-reducing behavior <D> is intended to mitigate the impacts of the hazard <A>. Moreover, often people will link their activities to their social network <J> or approach relevant authorities <Y>.

Models like this one can be elaborated and/or made specific to the problem type, the target audience, and the relevant attitudes and behaviors to be dealt with.

2. RISK PERCEPTION

Importance of Risk Perception

Risk perception can be seen as a result of a series of factors starting from psychological, sociological, empirical, cultural, educational, daily-political, or all that can

lead to a change of opinion, attitude or emotional response to challenge of exposure to certain risks.

The core area, called „risk perception“, has been a vivid subject of both societal debate and scientific research for decades. The starting point was to establish „risk“ as a subjective concept, not an objective entity; to include technical/physical and social/ psychological aspects in risk criteria; and to accept opinions of „the public“ (i.e., not just scientists) as the matter of interest. This approach was developed by B. Fischhoff, S. Lichtenstein and P. Slovic („Oregon Group“) [4].

From the aspect of risk management efficiency, it is of the utmost importance to objectify criteria and relationships to efforts required by risk management against the convenience of neglecting the dangers, expecting that the worst will not happen.

Excessive and unjustified risk rejection establishes a very low sensitivity threshold, reduces possible solutions in specific situations, increases the risk management process and consequently questions the appropriateness of risk management.

The second extreme is expressed appetite in risk acceptance, which is one of the main features of irresponsible management. The exposure of humans, material goods and natural resources to dangerous conditions is unacceptably high, and the cost of unwanted events ultimately exceeds the savings made by neglect of safety requirements.

Knowledge of hazards as an individual understanding of hazards as a dangerous condition, loss, missed opportunity, etc. is a prerequisite for proper identification and risk qualification, and all further risk management procedures depend on it. With better understanding of the hazards, it is possible to provide a better response, which reduces the vulnerability and thus the risk of disaster. Risk Perception is a measure that shows how exposed people feels in a state of risk exposure, and is influenced by social, cultural context and previous experiences with such risks.

The preparedness measures implementation is of vital importance for empowering the community at risk. In order for these measures to be adopted and accepted, they must always be noted and emphasized. Appropriate behavior in response to the catastrophe is directly dependent on the knowledge of hazards, as well as the social, cultural and economic context. Educational campaigns inform the public about specific risks and how to avoid them, how to prepare for them and provide response. By conducting such campaigns in a way that affects risk perception and leads to informed decision-making, risks ignorance and thereby comunity risk is reducing.

Through the information dissemination policy, affirmation of transparency in work, education, training, simulated risk situations, it is possible to shape endangered social groups risk perception.

The modeled risk perceptions criterion can be simplified to be defined as „achieving a measure“ between unjustified fear or panic and neglecting the consequences of risk exposure.

Risk Perception research

Although the sphere of these researches emerged in psychology, it soon became clear how broad sociology perspectives are, as well as concepts of philosophy. Multiple discoveries are essential for understanding risk acceptance conflicts and risk management improvement. Continuous communication with vulnerable groups can influence risk perception, risk appetites, and it is of particular importance to influence the opinions, attitudes and actions of vulnerable persons during crisis management.

Lindell and Hwang [8] tested several theories in order to determine motivating factors of risk reduction behaviour. The study combined the expectancy theory [18], the theory of reasoned action [5], planned behaviour theory [1], protection motivation theory [13], person-relative-to-event (PrE) theory [11] and the protective action decision model [9] into a proposed model as illustrated in Figure 5.

The study then identified the theories and their accompanying motivating factors which were proven to be more indicative of behavioural change (solid lines), and lesser indicative of behavioural change (dotted lines). This model therefore suggests that perceived personal risk is strongly influenced by that person's income, their gender and previous hazard experience. This risk then impacts on how that person makes certain adjustments to mitigate, prepare for or prevent the hazard..

Factors that have a lesser impact on perceived personal risk and therefore hazard adjustment includes ethnicity, hazard information, hazard proximity, and past hazard experience. Interestingly, personal income also strongly impacts hazard proximity, indicating that poorer individuals generally are closer to hazard areas more than wealthy people are.

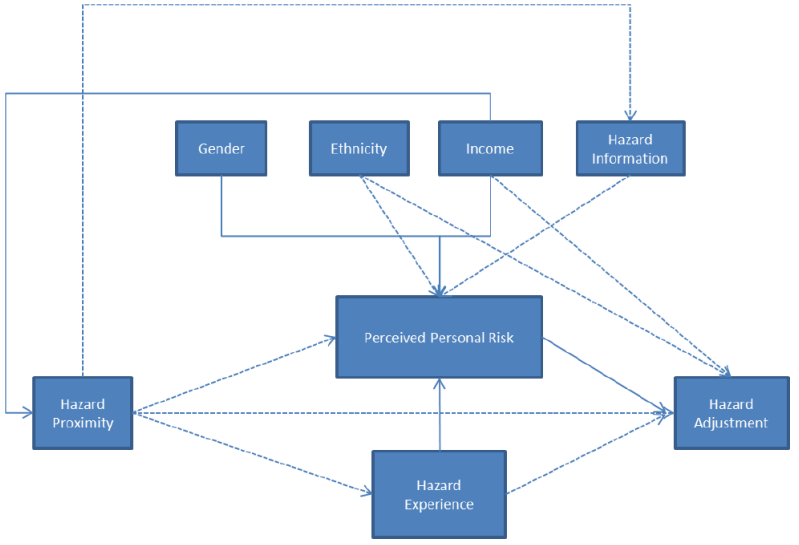

Figure 5 – Model to explain response to natural hazards, source: [8]

Obviously, risk communication is a necessary link between risk perception and risk management. Given the great importance of effective disaster prevention, risk communication programs must be based on understanding of fundamental socio-psychological processes as a prerequisite for successful communication.

Risk perception research main issues are the cognitive structure of risk ratings, subjective concepts underlying risk judgments, the determinants of perceived risk magnitude and risk acceptance, links to actual behaviour, and differences between societal groups or countries and cultures ([4], [14], [15], [16]) . These issues are linked in Figure 6.

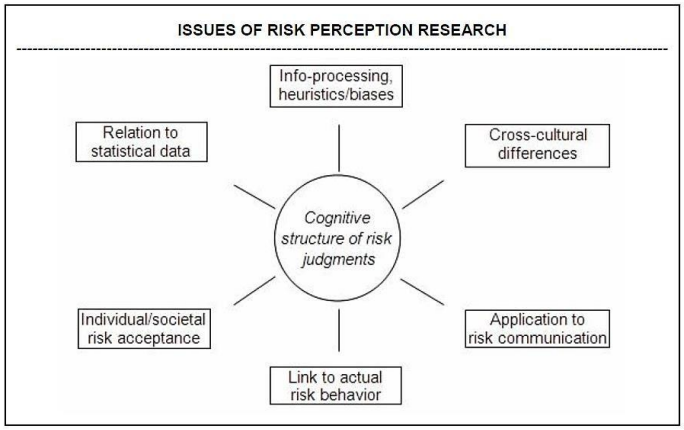

Figure 6 – Issues of risk perception research, source: [20]

The assessment of risk magnitude and risk acceptance, as two basic aspects of risk perception, depend on two types of factors: hazard attributes and socio-psychological characteristics of exposed persons.

The conceptual model shown in Figure 7 reveals the multiple influences which affect responses to risk exposure.

The principal message of this model is that neither perceived risk magnitude nor risks acceptance can be sufficiently explained by quantitative features such as event probabilities or expected damage. Emotional links to risk situations, opinions regarding environment and technology and attitudes like risk propensity all play a role in this process, which is embedded in the health & safety culture of a society. However, based on their knowledge, personality and social environment, each individual may develop a personal influence pattern for the relevance of the factors embodied in this model. Consequently, risk evaluations vary to a great extent across countries and cultures.

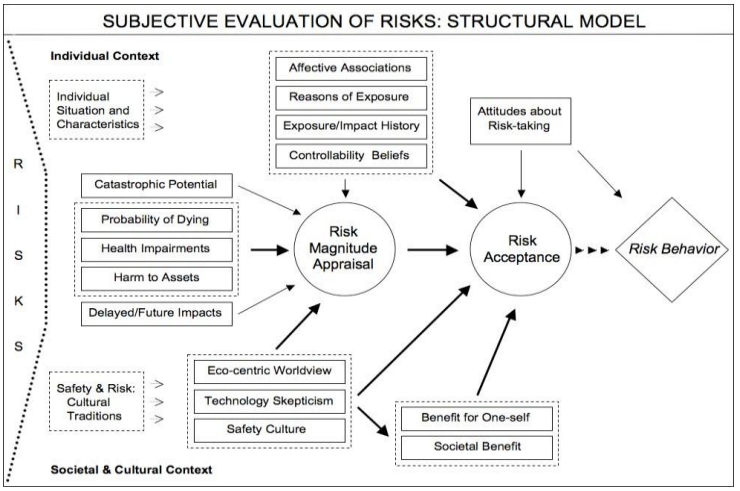

Figure 7 – Subjective evaluation of risks: structural model, source: [20]

The reality is that people suffer and die as a result of inaccurate information or misperception. It is especially important to be aware of intuitive heuristics and common bias when concluding in a situation where personal or institutional decisions have far-reaching consequences. Communication officers, risk managers, as well as media representatives, interested parties and affected public should be well informed about the findings of risk perception and risk response. They need to know typical forms of information processing and explanations when dealing with the creation of communication programs and risk management measures. At the same time, potential information recipients should be aware of the main psychological and social perception mechanisms as a means to avoid painful mistakes.

Findings about socio-psychological risk perception processes are significant for:

- analyzing discrepancies between statistical risk data and subjective judgments,
- understanding the influence of professional and societal orientations ("worldviews"),
- separating differences between countries and those amongst social groups,
- expounding why various people underrate or ignore existing hazards,
- clarifying the roots of controversies about risky technologies,
- identifying core needs for risk communication and disaster preparedness programs,
- designing risk information in line with people's thinking about hazards,
- recognizing reasons for shortcomings of safety campaigns,
- considering cultural differences in conceptualizing and conducting risk communication.

For some hazards, professional opinions or public attitudes (or both) have changed in history. Good examples are: the impact of nuclear power plants on human health has been overestimated with respect to the influence of thermal power plants, smoking is much

more perceived as very risky nowadays, gambling has not been perceived as a financial hazard for years, excessive consumption of food has become a major theme in health programs.

Almost every person has limited knowledge, and the decision-making process is not standardized. It all begins with an intuitive definition of the risk that a person applies and ends with the character of importance of general social attitudes such as skepticism for new technologies. Finally, risk perception is the interpretation of the world, based on experience and / or beliefs. It is embedded in norms, values systems and cultural characteristics of the society, and therefore distinguished by social groups and states.

One of the key questions is to fully understand how people make their assessment of the current danger in deciding what to do and not to do, and how to avoid or at least reduce the risk. Therefore it is necessary to link both: risk perception and risk behavior. In the narrow sense, „risk communication" and „risk perception" can be seen as an integral part of risk management, ie as an integral part of concrete measures with a defined role of communicating factors and those whose risk perception is related to the mentioned measures.

Risk perception alone can not be enough to understand the preparedness; nor any other individual approach. However, the results of socio-psychological, health behavior and sociological studies suggest that risk perception plays a significant role in preparedness. Risk perception directs decisions on risk acceptance and represents a fundamental influence on behavior before, during and after disaster. However, neither perception nor risk attitudes should be taken as equivalent to actual behavior.

„Facts alone literally have no meaning until our emotions and instincts and experiences and life circumstances give rise to how we feel about those facts". (Ropeik, D. 2014 Feelings matter more than facts alone: A challenge and opportunity for science advisers).

3. QUESTIONS

1. Through which contexts can we observe communication as „information exchange" in risk management?
2. Explain the meaning of the „communication life cycle"?
3. What are the elements of successful communication?
4. What are the main characteristics of crisis communication in the initial phase of crisis?
5. Risk communication during the crisis?
6. „Post-crisis" communication?
7. What impacts the risk perception?
8. Explain the correlation between „risk communication" and „risk perception"?
9. Risk management failures on the example of Lake Modrac dam (case study)?

4. REFERENCE

[1] Ajzen, I. 1991. *The theory of planned behaviour. Organizational behaviour and Human Decision Processes*

[2] Blanchard-Boehm, R.D., Earl, R.A., Wachter, E.J & Hanford, E.J. 2008. *Communicating future water needs to an at-risk population: lessons learned following defeat of the Applewhite Dam and Reservoir Project in San Antonio,* Texas.

[3] Christine Reckelhoff-Dangel, Dan Petersen, *Risk Communication in Action: The Risk Communication Workbook*, US Environmental Protection Agency, 2007

[4] Fischhoff, B., Lichtenstein, S., Slovic, P., Derby, S. L. & Keeney, R. L. (1982). *Acceptable risk*. Cambridge: University Press

[5] Fishbein, M. & Ajzen, I. 1975. *Belief, Attitude, Intention and Behaviour*. Reading, MA: Addison-Wesley

[6] IRGC (International Risk Governanve Council), *Risk governance – towards an integrative approach – White paper*, Geneva 2006

[7] Leiss, W. *Three Phases in the Evolution of Risk Communication Practice*

[8] Lindell, M.K. & Hwang, *Households' Perceived Personal Risk and Responses in a Multihazard Environment. Risk Analysis.* S.N. 2008.

[9] Lindell, M.K. & Perry, R.W. *Behavioural Foundations of Community Emergency Planning*. Washington, DC: Hemisphere 1992.

[10] Morgan, M.G., Fischhoff, B., Bostrom, A., Atman, C.J. *Risk Communication: a mental models approach*. Cambridge University Press. 2001.

[11] Mulilis, J.P. & Duval, T.S. 1997. *The PrE model of coping with threat and tornado preparedness behaviour: The moderating effects of felt responsibility.* Journal of Applied Social Psychology 27(19): 1750-1766.

[12] Reckelhoff-Dangel C., Dan Petersen, *Risk Communication in Action: The Risk Communication Workbook*, US Environmental Protection Agency, 2007

[13] Rogers, R.W. *Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection and motivation*. In Social Psychophysiology: A Source Book, edited by J.T. Cacioppo & R.E. Petty. New York: Guilford Press 1983.

[14] Rohrmann, B., *A socio-psychological model for analyzing risk communication processes*, The Australasian Journal of Disaster and Trauma Studies, ISSN: 1174-4707, Volume : 2000-2

[15] Rohrmann, B. *Comparisons of risk perception in different cultures: Profile and synopsis of a social science research venture conducted in 9 countries*. Roman Research Road, Melbourne, July 2013

[16] Rohrmann, B. *Risk Perception, Risk Attitude, Risk Communication, Risk Management: A Conceptual Appraisal*

[17] Renn, O. (2008), *Risk Governance: Coping with Uncertainty in a Complex World*, www.ortwin-renn.de

[18] U.S. Department of Health and Human Service, Centers for Disease Control and Prevention; *Crisis and Emergency Risk Communication*, 2014 edition,

[19] Vroom, V.H. *Work and Motivation*. New York: Wiley 1964.

[20] http://www.rohrmannresearch.net/pubrr.html

[21] https://web.actuaries.ie/sites/default/files/erm-resources/risk_management_framework_all_steps

[22] https://www.epa.gov/risk/risk-communication